

REMARKS

With claims 14, 15, 19, 56, 59-61 and 64-66 pending, claim 64 has been cancelled, and claims 60-61 and 66 have been amended as described in detailed to follow.

Claim Objections

Claim 64 is objected to as being improper form in it recites the limitation of “heating to a temperature greater than 300 C” while independent claim 14 already recites heating to a temperature between 300 C and 600 C. In response, claim 64 has been cancelled.

Claim 66 stands objected to because in lines 1-2, the phrase “in a surface selected from side electrodes, electrode shields” requires the word –and– instead of a comma. Claim 66 has been amended to overcome this objection by being made dependent on claim 59 and to change the language identified by the present Office Action to comply with the language of claim 59.

Based on the above amendments, Applicant respectfully requests that the claim objections be withdrawn.

Section 112, Second Paragraph Rejection

Claims 60-61 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Office Action states that claims 60 and 61 depend on cancelled claim 58, but are believed to depend on claim 59. In response, Claims 60-61 have been amended to be dependent on claim 58. Accordingly, claims 60-61 are now believed to be in condition for allowance under 35 U.S.C. 112, second paragraph.

Section 102 Rejection

Claims 56 and 59-61 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Collins. The Office Action states that Collins shows Applicant's claimed invention including a reactor chamber 16B, an upper electrode 17T/17S with power applied thereto from a RF source 40, at least one side electrode 12, a first heater 96 that heats said upper electrode, and a second heater 92 that heats said at least one side electrode (referencing fig. 1 and col. 7 lines 45-50), and gas inlets and outlets, the method comprising: introducing process gas into said chamber 16B, and heating the upper electrode with said heater ..., and heating the at least one side electrode with the second heater. The Office Action refers to Fig. 1 and its description and col. 21-line 43 to col. 22-line 43. This rejection is respectfully traversed.

The element 12, identified by the Office Action as a side electrode 12, is not indicated in Collins to be an electrode. Instead, the element 12 is identified in col. 7, lines 19-22 as being only a side wall. Accordingly, heating of element 12 does not comprise heating of an electrode, as claimed in claim 56. Accordingly, claims 56 is believed allowable as not anticipated by Collins under 35 U.S.C. § 102(b).

Heating is not identified in Collins to be provided to a degree such that "etch materials deposited on the surface with the heater form a stable layer of material that does not flake off onto the workpiece" as claimed in claims 59-61. Accordingly, claims 59-61 are believed allowable as not anticipated by Collins under 35 U.S.C. § 102(b).

Section 103 Rejection Of Claims 14 (Over Imai)

Claim 14-15 and 64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Imai. Claim 64 has been cancelled rendering this rejection with respect to claim 64 moot. Regarding remaining claims 14-15, the Examiner states that Imai teaches the elements claimed, but fails to expressly disclose heating the upper electrode to a temperature of about 300 Celsius to about 500 Celsius. However, the Examiner indicates a prima facie case

of obviousness still exists because generally, differences in concentration or temperature will not support patentability unless there is evidence indicating such concentration or temperature is critical. The Examiner cites In re Aller, 105 USPQ 233, 235 (CCPA 1955) for the proposition “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” This rejection is respectfully traversed.

Applicant’s critical temperature range is well beyond an optimum work range for a reactor (normally below 100 Celsius) as might be found by routine experimentation, as referred to in In re Aller. Applicant’s specification on page 6, paragraph 25 indicates that the electrode in a reactor under normal operation conditions will have a maximum temperature of 100 Celsius. In the previous paragraph 24 on page 6 of Applicant’s specification, the temperature of the electrode in the preferred embodiment ranges from 300 Celsius to 500 Celsius. On page 6, paragraph 26 of Applicant’s specification it is disclosed that the increased electrode temperature the deposits form thinner and more durable layer which sticks better to the electrode surface and does not easily flake or spauld off. As indicated on page 2, paragraph 5, making the deposits more durable is a critical feature of the present invention.

Although Imai discloses a heating element 11 provided on an electrode 5, it only discloses heating to assure a uniform temperature across the electrode. See, Imai column 1 lines 39-41. No disclosure is provided in Imai to increase the electrode temperature above the 100 Celsius normal operation to a range as high as about 300 Celsius, as claimed in claims 14, 15 and 64. A temperature significantly above 100 Celcius is outside a “workable range” identified in In re Aller. Accordingly, claims 14, 15 and 64 are believed allowable as non-obvious under 35 U.S.C. § 103 over Imai.

Section 103 Rejection (Over Imai in view of DeOrneallas)

Claims 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Imai in view of DeOrneallas. The Examiner states that Imai discloses the claim elements except it fails to expressly disclose a platinum etch method, where heating the upper electrode causes deposits of oxygen and chlorine to de-absorb leaving mostly platinum deposited as claimed. The Examiner further states, however, that the disclosure of a platinum etch process in DeOrneallas in combination with Imai renders Applicants' claim 19 obvious. This rejection is respectfully traversed.

DeOrneallas does not disclose heating the upper electrode to cause deposits of oxygen and chlorine to de-absorb from the upper electrode in order to leave mostly platinum deposited, as claimed in claim 19. As indicated on page 6, paragraphs 24-26 of Applicant's specification, significant heating of the upper electrode is needed to cause de-absorption and leave mostly platinum deposited. A typical reactor can deposit platinum, as disclosed in DeOrneallas. However, neither DeOrneallas nor Imai disclose the further step of heating to a degree needed to cause de-absorption of oxygen and chlorine leaving mostly platinum to be deposited. Accordingly, claim 19 is believed to be patentable as non-obvious under 35 U.S.C. § 103 over Imai in view of DeOrneallas.

Section 103 Rejection Of Claims 16, 19 and 31 (Over Imai in view of Keizo)

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Imai in view of Keizo. The Examiner states that Imai discloses the claim elements except it fails to expressly disclose a platinum etch method, where heating the upper electrode causes deposits of oxygen and chlorine to de-absorb leaving mostly platinum deposited as claimed. The Examiner further states, however, that the disclosure of a platinum etch process in Keizo in combination with Imai renders Applicant's claim 19 obvious. This rejection is respectfully traversed.

Keizo does not teach or disclose heating the upper electrode to cause deposits of oxygen and chlorine to de-absorb from the upper electrode in order to leave mostly platinum deposited on the upper electrode, as claimed in claim 19. Keizo, instead, only teaches heating the workpiece to provide a platinum etch process. Imai, as indicated previously, further does not teach heating the electrode to a degree greater than used during a normal reaction process. Accordingly, claim 19 is believed to be patentable as non-obvious under 35 U.S.C. § 103 over Imai in view of Keizo.

Section 103 Rejection (Over Imai in view of Collins)

Claims 56, 59-61 and 65-66 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Imai in view of Collins. The Examiner states that Imai discloses the claim elements except it fails to expressly disclose providing power to the upper electrode and a three electrode structure with a side electrode which is heated. The Examiner further states, however, that the disclosure in Collins of a side electrode formed from the walls of a reactor which are heated in combination with Imai renders Applicant's claims 56 and 59-61 obvious. With respect to claim 60-61, the Office Action notes that inherently any gas collected on the upper surface will desorb or boil off from the surface as a result of heating on these surfaces. This rejection is respectfully traversed.

Claim 56 and 65 claim a second heater provided in a side electrode. As indicated previously, Collins' element 12, which the Office Action indicates to be a side electrode is merely a wall, so neither Imai nor Collins disclose a heater provided in the side electrode. Claims 56 and 65 are, thus, believed to be allowable as non-obvious under 35 U.S.C. § 103 over Imai in view of Collins.

Claims 59-61 and 66 claim "a heater provided in a surface selected from side electrodes, electrode shields, and walls of the reactor such that etch materials deposited on the surface with the heater form a stable layer of material that does not flake off onto the workpiece." Neither Imai nor Collins disclose heating to a degree

to form a stable layer of material that does not flake off onto the workpiece. Regarding claims 60-61, the Office Action states that it is inherent that gas collected on the upper surface will desorb or boil off as a result of heating, but no prior art reference discloses such heating such as the range of 300-500 C in Applicant's specification to cause such boil off. The conditions for boil off and temperature ranges cited are not within "workable ranges" within the prior art, which normally operates below 100 C, in contrast with the cited In re Aller. Claims 59-61 and 66 are, thus, believed to be allowable as non-obvious under 35 U.S.C. § 103 over Imai in view of Collins.

Section 103 Rejection (Over Collins)

Claims 14-15 and 64-66 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Collins. As with Imai, the Examiner indicates that Collins teaches the elements of claim 14, but fails to expressly disclose heating the upper electrode to a temperature of about 300 Celsius to about 500 Celsius. However, the Examiner indicates a prima facie case of obviousness still exists because generally, differences in concentration or temperature will not support patentability unless there is evidence indicating such concentration or temperature is critical, citing In re Aller. This rejection is respectfully traversed.

As with Imai, Collins does not teach or disclose increasing the electrode temperature beyond a normal operating temperature of up to 100 Celsius, and thus beyond "workable ranges" identified in In re Aller. As indicated above with respect to Imai, the temperature range of about 300 Celsius and above, as claimed in claims 14-15 and 65-66, is critical to Applicant's invention, in that it makes deposits on the electrode more durable than in reactions where the electrode is in a normal operating temperature. Accordingly, claims 14-15 and 65-66 are believed to be patentable as non-obvious under 35 U.S.C. § 103 over Collins.

Section 103 Rejection Of Claims 16, 19 and 31 (Over Collins in view of DeOrnellas)

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Collins in view of DeOrneallas et al. The Examiner states that Collins discloses the claim elements except it fails to expressly disclose a platinum etch method, or where oxygen and chlorine are present in the reactor and heating the upper electrode causes deposits of oxygen and chlorine to de-absorb from the upper electrode in order to leave mostly platinum deposited as claimed. The Examiner further states, however, that DeOrneallas discloses a similar configuration as Collins where platinum or other materials such as platinum are etched in a chlorine gas. The Examiner then indicates that it would have been obvious to modify the process of Collins so as to perform the platinum etching process of DeOrneallas because this would be a suitable method, for example, to reduce the platinum deposits that can form on the wafer. This rejection is respectfully traversed.

DeOrneallas does not disclose heating the upper electrode to cause deposits of oxygen and chlorine to de-absorb from the upper electrode in order to leave mostly platinum deposited, as claimed in claim 19. As indicated on page 6, paragraphs 24-26 of Applicant's specification, significant heating of the upper electrode is needed to cause de-absorption and leave mostly platinum deposited. A typical reactor can deposit platinum, as disclosed in DeOrneallas. However, neither DeOrneallas nor Collins disclose the further step of heating to a degree needed to cause de-absorption of oxygen and chlorine leaving mostly platinum to be deposited. Accordingly, claim 19 is believed to be patentable as non-obvious under 35 U.S.C. § 103 over Collins in view of DeOrneallas.

Section 103 Rejection (Over Collins in view of Keizo)

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Collins in view of Keizo (JP 07-130712A). The Examiner states that Collins discloses the claim elements except it fails to expressly disclose a platinum etch method, where heating the upper electrode causes deposits of oxygen and chlorine to de-

absorb leaving mostly platinum deposited as claimed. The Examiner further states, however, that the disclosure of a platinum etch process in Keizo in combination with Collins renders Applicant's claim 19 obvious. This rejection is respectfully traversed.

Keizo does not teach or disclose heating the upper electrode to cause deposits of oxygen and chlorine to de-absorb from the upper electrode in order to leave mostly platinum deposited on the upper electrode, as claimed in claim 19. Keizo, instead, only teaches heating the workpiece to provide a platinum etch process. Collins, as indicated previously, further does not teach heating the electrode to a degree greater than used during a normal reaction process. Accordingly, claim 19 is believed to be patentable as non-obvious under 35 U.S.C. § 103 over Collins in view of Keizo.

Conclusion

In light of the above amendments and remarks, claims 14-15, 19, 56, 59-61 and 65-66 are all believed to be in condition for allowance. Accordingly, reconsideration and allowance of these claims is respectfully requested.

Respectfully submitted,

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